

SURFACE WATER AMBIENT TOXIC
MONITORING PROGRAM

FINAL REPORT
EXECUTIVE SUMMARY
2006

DIVISION OF ENVIRONMENTAL ASSESSMENT
MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION
AUGUSTA, MAINE 04333

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INTRODUCTION

This 2006 Surface Water Ambient Toxic (SWAT) monitoring program final report is organized into this Executive Summary (with introduction and table of contents) and 4 modules, 1) Marine & Estuarine 2) Lakes, 3) Rivers & Streams, and 4) Special Studies. The full report is available on DEP's website at <http://www.maine.gov/dep/blwq/docmonitoring/swat/index.htm>

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Chemical analyses were performed by AXYS Analytical Services, Sidney, British Columbia or other laboratories as listed in reports in individual sections.

EXECUTIVE SUMMARY

Maine's Surface Water Ambient Toxics (SWAT) monitoring program was established in 1993 (38 MRSA §420-B) to determine the nature, scope and severity of toxic contamination in the surface waters and fisheries of the State. The program must be designed to comprehensively monitor the lakes, rivers and streams and marine and estuarine waters of the State on an ongoing basis. The program must incorporate testing for suspected toxic contamination in biological tissue and sediment, may include testing of the water column and must include biomonitoring and the monitoring of the health of individual organisms that may serve as indicators of toxic contamination. This program must collect data sufficient to support assessment of the risks to human and ecological health posed by the direct and indirect discharge of toxic contaminants.

The Commissioner of the Department of Environmental Protection (DEP) must prepare a 5-year conceptual workplan that outlines monitoring approach for the following 5 years. The Commissioner must also develop annual workplans that define the work to be accomplished each year. A Technical Advisory Group (TAG), composed of 10 individuals with scientific backgrounds representing various interests and 1 legislator, is established to advise the Commissioner on the development of the 5-year framework and annual workplans.

The first 5-year framework, for the period 1994-1998, was an initial sampling of all watersheds in the state. The 5-year plans for the periods 1999-2003 and 2004-2008 were focused on problems discovered in the initial periods and were designed to confirm the initial findings and establish background conditions. Once those are established and a sufficient amount of time has elapsed, 5-10 years depending on what if any action has occurred to solve the problem, repeat sampling may be conducted to determine if the problem has been solved. The program also explores new issues as they are identified.

The SWAT program is divided into 4 modules, 1) Marine and Estuarine, 2) Lakes, 3) Rivers and Streams, and 4) Special Studies. This annual report follows the outline of the 2005 workplan recommended by the SWAT TAG in a meeting June 20, 2006. Following is a summary of key findings from the 2006 SWAT program for each module.

1. MARINE AND ESTUARINE

- Sediment monitoring occurred at one location, Mill Creek, Falmouth, in 2006. This location was selected to assess potential contamination from extensive development in upland areas, much of which is associated with Rte 1.
- Blue mussel monitoring occurred at five sites along the coast in 2006: Spruce Creek, Kittery; Back Cove, Portland; Cocktail Cove, Great Diamond Island, Portland; Mill Creek, Falmouth; and Taunton Bay, Franklin (four replicates per location).
- Lobster collections occurred at 19 stations over the southwestern half of the Maine coast in conjunction with the EPA National Coastal Assessment (NCA). 2006 marks the last of three years that DEP has sampled lobster in conjunction with NCA. When combined

with the data from the 2004 and 2005 lobster collections from other areas of the Maine coast, the 2006 data will complete geographic coverage of lobster from much of the Maine coast. DEP will continue to provide lobster data as it is reviewed and as more data arrives from the contracted laboratory. Pending review of the results, the data will be provided to the state toxicologist for use in updating public health advisories. It will also be posted on the DEP SWAT web site.

2. LAKES

- The US Fish and Wildlife Service is considering delisting the bald eagle from the Endangered Species List. A cooperative study of bald eagles with the Maine Department of Inland Fisheries and Wildlife, US Fish and Wildlife Service, Passamaquoddy Tribe, Penobscot Nation, FPL Energy, and BioDiversity Research Institute found that concentrations of mercury in nestling and adult eagles are higher than most other populations in the US and similar to those near mercury mines or other point sources. Mercury concentrations in 23-39% of Maine eagles are elevated or higher, and within the range of potential population impacts in certain hotspots. Concentrations have not diminished, and perhaps elevated, in some areas of Maine since the early 1990s.
- In 1996, mercury concentrations were found to be higher in fish and sediments from several lakes and ponds southeast (downwind) of Orrington, where there was the Holtrachem chloralkalai plant and PERC municipal waste combustor, than from the general population of Maine lakes. Samples collected from the same lakes in 2006 show that mercury levels in fish have not changed significantly since the Holtrachem plant closed in 2000.

3. RIVERS AND STREAMS

- Thirty-nine stations, primarily in the Penobscot River and North Coastal Rivers basins, were assessed for the condition of the benthic macroinvertebrate community. Results have been received to date (June 12, 2007) for twenty-three stations. Eleven of the twenty-three stations (48 %) reported failed to attain the aquatic life standards of their assigned class.
- Striped bass and bluefish exceed the Maine Center for Disease Control and Prevention's (MCDC) fish tissue action levels for mercury and PCBs in the Androscoggin, Kennebec, and Saco rivers as in past years. MCDC is leading a process with all other Atlantic coast states with significant fisheries for these fish to explore the desirability of a coast wide fish consumption advisory, since these species are coast wide migrants.
- A Cumulative Effects-driven Assessment of fish populations above and below Lincoln found little evidence of endocrine disruption, although lab data are pending. There was a small incidence of feminization of male fish below Millinockett and Lincoln in 2005

samples, but the amount (10%) is not much different from that commonly reported in the literature (5%) assumed to be background and of little consequence to the population. As in 2005, there was strong evidence for nutrient enrichment from the mills and municipal treatment plant discharges. A similar study above and below Skowhegan and the SAPPi mill on the Kennebec found no evidence of endocrine disruption, although lab samples are still pending. The nutrient enrichment measured on the Kennebec in 2004 was greatly diminished in 2006.

- A caged mussel study above and below the SAPPi bleached kraft pulp and paper mill on the Kennebec indicated nutrient enrichment, unlike the fish study. A similar study on the Penobscot above and below Lincoln, found no evidence of nutrient enrichment, unlike the fish study. As lab data are still pending, no conclusion about endocrine disruption can be made yet for either river.

4. SPECIAL STUDIES

- In a study of endocrine disruption in the Penobscot River, reporter gene analysis and whole animal studies with zebrafish both revealed the presence of estrogenic compounds in effluents of Old Town, Orono, and Bangor wastewater treatment facilities. Levels of estrogenic compound were, however, not sufficient over the course of our assessments to elicit an effect greater than the equivalent of 10 nM 17 α -ethinylestradiol, the synthetic estrogen in human birth control pills.
- Preliminary laboratory studies of the potential replacement blueberry pesticides SpinTorTM (active ingredient spinosad) and CallistoTM (active ingredient mesotrione) indicate that at environmentally realistic concentrations, these pesticides may have no significant effect on innate immunity, development rate or behavior (spontaneous swimming) of zebrafish.. However further replication is needed to confirm these initial findings.

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